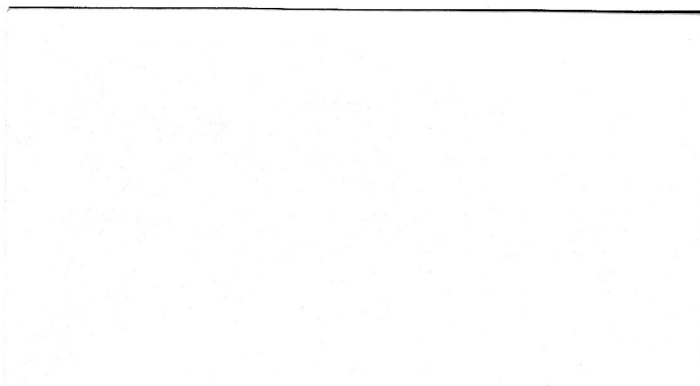


A Datapro Feature Report

**All About
The Integration of
Word and Data Processing**



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A Datapro Feature Report

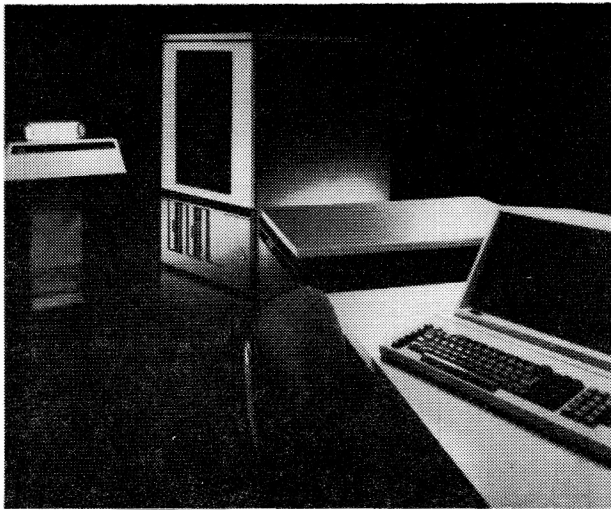
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The Integration of Word Processing and Data Processing



The Nixdorf 8845, which combines data entry, word processing and data processing into a single, fully integrated office system. Concurrent, or transparent access to various operating modes is employed by this system.

The computer has garnered a certain mystique over the years. To the average person, a computer used to be a large mainframe device, probably made by IBM, that was found in some sort of refrigerated vault at corporate headquarters. The machine was called a "central processing unit" meaning that it gulped all company information like some hungry, all-pervasive, black hole. Whither this information went was only known to the programmers and technicians who operated the equipment. The function of a computer was called *data processing (DP)*, which was a deeply complicated matter understood only by computer specialists. Then came the idea of distributed processing, and the computer terminals began to pop-up in the domains of the office workers. So too did the so-called computer specialists—who really weren't quite as special as they seemed—and the mystique of computers has been crumbling ever since. Today, with the advent of small and personal computers, the concept of data processing is much more familiar to the average person.

About the same time that computers began to get smaller, the typewriter began to get bigger, at least in terms of sophistication.

Not only did there appear new typewriters with interchangeable typing elements and correcting features (i.e. the IBM Selectric), but another new strain of machine was even capable of storing keystrokes for future use, or centering a line or automatically typing a letter. This ability to deal with text the way a computer dealt with numbers was called *word processing (WP)*. Today word processing devices have grown into small computer systems, and users are suddenly noticing that they have been dealing with computers for quite some time, whether they knew it or not.

The information processing industry has reached a point where it has become unwise to segregate the notions of *word processing* and *data processing* any longer. The makers of office machines now use microprocessors—tiny computers—to drive their text processing equipment. The makers of mainframe computers, on the other hand, have developed software for their large CPUs to enable their DP customers to perform word processing functions. Somewhere in-between these two realms a new development has emerged which combines the power of the microcomputer with readily available software packages to perform all types of applications for the home or business. This report is an overview of the move to integrate WP and DP operations, and create office systems that are truly multi-functional.

Well, if computers do data processing and word processors do text processing, why don't we have devices that do both of these things? The plain and simple answer is that we do.

WHAT IS THE INTEGRATION OF WP AND DP?

For reasons involving everything from office politics to vendor product design, there is a firm belief that word processing and data processing are difficult to mix. The idea behind *integration* is that a single workstation can be used to perform both DP and WP tasks freely and interchangeably, hopefully with some form of dialog between the two modes. After all, both functions require the creation and manipulation of digital bit patterns; it shouldn't really make any difference what these codes represent to the computer, so long as it has the control logic to maintain order and perform the designated processing tasks. In other words, one should be able to mix the text of a document created in the word processing mode with the numbers that were calculated in an accounts receivable DP mode. Is that really asking too much? Until recently, the cost of computing power was expensive and it was asking too much. But now, with the plummeting costs of microprocessors, small computer systems have been designed that can truly be used for whatever purposes are at hand, from word processing to data processing, from video games to electronic messaging.

HOW DO WP AND DP DIFFER?

Word and data processing are similar in the sense that they both employ computers to store and manipulate information. The technical difference between the two lies

The Integration of Word Processing and Data Processing



The Xerox 8010 Star, a professional workstation which offers access to integrated functions such as word processing, electronic mail, computing, graphics and communications. The photo depicts the use of the off-screen "mouse" interaction aid so that a user can retrieve information without having to use the keyboard.

▷ in the fact that one employs special digital codes to represent characters of the alphabet while the other is designed around codes used to designate numbers. That technical difference—text versus numbers—naturally gives rise to the differences in applications that are found in word and data processing. The segregation of the two concepts originally took place because of these technical differences, which in turn led to different applications for the two types of systems.

Word processing involves most any application which employs words as the final output. Familiar examples would be the creation of reports or documents, form letters, or legal papers. In each case, the word processor is capable of applying some special technique to the organization and formatting of words on the printed page. The material can be edited electronically prior to being printed and it can all be stored so that it does not have to be re-keyed when the job has to be revised.

Data processing, on the other hand, is devoted to the worship of numbers instead of words. DP is typically associated with big number-crunching jobs like payroll, accounts receivables/payables, sales records and so forth; applications for which numerical calculations are the primary objective.

TYPICAL APPLICATIONS FOR WP AND DP

When people ask about the integration of word and data processing, they are actually asking about specific

applications that they have in mind. Because there is a traditional distinction between what word processors do and what computers do, it would probably make some sense to list the traditional applications associated with each area. Here they are:

WORD PROCESSING

- Document Preparation
- Records Management
- Form Letters
- List Processing
- Mass Mailings
- Stored Formats
- Tab & Column Work
- Forms Creation
- Statistical Reports
- Sales Reports

DATA PROCESSING

- General Ledger
- Accounts Receivable
- Accounts Payable
- Inventory Control
- Payroll
- Mailing List
- List Processing
- Forecasting
- Modeling
- Sales Records

Integrating word and data processing means that you could take any item from column A and combine it with column B. For example, a Statistical Report summarizing the demand and availability of a certain widget stored in the warehouse could be supplemented by figures derived from the Inventory Control package of the computer. Or take a report that was being prepared for management on sales trends in your company's remote offices. That could be supplemented by figures cooked-up by the Accounts Receivable or Sales packages. In an integrated office system, these dual lists of WP and DP applications would be combined into a single list because one machine would be capable of handling all of these tasks.

DO INTEGRATED SYSTEMS EXIST?

Yes. If you have a small computer like an Apple you also have software for many applications at your disposal through a thriving software industry. If you want to finish up a chapter on your novel, then you use one of about 200 available, independently-produced, word processing packages. If you want to take charge of your free-lance writing expenses, then you probably have one of many available general ledger packages to record your financial activity. When it comes time to send out notices about your book to friends and press, you can use a mailing list package you picked up for \$50.00. In doing all of these things, you have demonstrated your ability to perform both word and data processing tasks. A small or personal computer, in other words, is a kind of integrated system because it will run any type of package you load into it. The full intermixing of these programs may not be fluid, but the single piece of equipment is indeed capable of performing both word and data processing jobs. Beyond the personal computer are a number of further stages of WP and DP integration. At this point, we should take a moment to categorize these various stages.

STAGES OF INTEGRATION

The integration of word and data processing from a systems point of view can, of course, vary in great degrees. Let's first agree that it is being done. Now, if we look at the kinds of systems which fall within this integration category, what do we find? Let's see.

The Integration of Word Processing and Data Processing

Small/Personal Computers—At the very base level of integration we have microcomputers that can run software packages of any shape and variety. All that is required by the operator is a simple change of program diskette to switch a unit from a WP to a DP application mode. True, these systems aren't always the fastest, most reliable, and easiest to use, but there is no denying that one workstation can be applied for many different types of applications. We hesitate to even call this a systems approach, but it does warrant mentioning because the use of small computers has had such a dramatic effect on the way systems are designed and sold in today's industry. Products from Apple, Atari, Commodore and Radio Shack represent the kinds of products we are referring to here.

Word Processing Systems—Yesterday's word processors were rather dumb machines, programmed in ROM to perform only those tasks that were specified in fixed instructions by the vendor. Today's word processors are a different breed altogether. They not only contain microcomputers to control system functions, but most of them are software programmable by the operator for whatever tasks are at hand. Not only do word processing vendors offer multi-faceted text handling software for their machines, but they have begun to handle sophisticated information-handling packages that are not unlike mini-versions of large scale computer programs. Examples include software packages to handle statistical analysis and forms, general list processing, large mailing lists, and general ledger. In terms of ease of use, the integration of WP and DP on a programmable word processor is generally better engineered from a human factors standpoint (i.e. attractive displays, comfortable keyboard, simple instructions to follow, etc.), but are usually no more "integrated" than a small or personal computer. While working at one of these systems, then, the user generally has to switch from program diskette to another and handle merging and interplay through a separate storage module. Many clustered and multi-terminal systems ease this interplay through the use of shared files, shared printers, shared communications output, and shared software.

Distributed Processing Systems—The best the industry can offer today in the way of integration is generally being done by companies with computer expertise. Datapoint, for example, uses a network of distributed processors, putting intelligent workstations in the hands of each user. Each terminal can then access a variety of software applications (i.e. word processing, data processing, electronic mail, etc.) that are housed in the controller under the guise of a single package called an office automation program. The commonality of the processing power and the ability to share the same available software features distinguishes the Datapoint approach from other companies that market applications in chunks, and processing power in a more rigid system architecture. Datapoint also has the advantage of their ARC communications network for establishing local

networks, and various PBX and controller devices for managing the flow of information. Other companies offering equally intriguing "systems" approaches to integrating WP and DP include Wang (the OIS system), Burroughs (the OFIS network), IBM (the 5520 and 8100) and Xerox (the Star professional workstation and Ethernet local network).

Integrated Workstations—We are already beginning to see the influx of specially designed workstations that are meant to ease the integration of total systems power. For these rather expensive items—like the Xerox Star, Artelonic 1000, Apollo Computational Node, and others—the integration of word and data processing is simply one of a number of special conveniences offered the professional worker. In addition to the ability to merge DP and WP files, one can use a typical system like these to display and output special graphics (like bar charts, pie charts, drawings, symbols, etc.), originate electronic mail messages, create electronic files, provide a window onto shared files within a work group, maintain personal calendaring, perhaps to digitize voice messages for storing and forwarding and a host of other applications. Some of these systems even employ special operator interaction devices so that the user—who may not be an expert typist—can use information through the display without having to type. This futuristic version of an integrated system is here today, but at a premium cost. ➤



The AM Jacquard J100 multifunction computer system was actually a minicomputer that has been re-packaged as a shared-logic word processor. With a BASIC compiler, however, it can be used in the data processing mode as any other minicomputer.

The Integration of Word Processing and Data Processing

▷ SELECTING A SYSTEM

This report has pointed out that integrated systems do exist in the market, but we've also shown that a precise definition of "integration" has yet to be formulated. In other words, there are various levels of sophistication involved in this issue, and a melange of solutions have been offered by different vendors. What do you do if you're on the market for some sort of integrated system, but you're not entirely sure which route is best? The following list summarizes some of the typical features of today's integrated systems. Decide which of these features suit your needs and then look for a system/vendor which provides them. For more information on the makes and models of integrated systems that are currently available, see the WP/DP Office Systems comparison tables which begin on page WP11-040-501.

- Ability to perform word processing and data processing applications. In a system that isn't very flexible, the operator will have to completely sign-off from one mode to access the other, and the only means of interplay between DP and WP is through the creation of files from which to merge information. The ideal approach is called *concurrent* WP & DP, which means that the task of switching from one mode to the next is virtually transparent to the operator, and that the exchange of information between modes is very fluid.
- If a word processor has List Processing and Math software available, it is entering the area of data processing and may have more potential as an integrated system as the vendor continues to upgrade the equipment.
- A link between a word processor or a small computer and a host computer.
- On a word processor, the availability of a computer language compiler (typically a BASIC compiler) which allows the unit to be programmed by the user.
- The availability of shared resources—printers, OCRs, mass storage, special network controllers, etc.—for a word processor or computer system invites the integration of WP and DP functions in a systematic way. Clusters and multiple stations consisting of both WP and DP terminals can then be employed in a single network, and may be made to share common software programs.
- Any kind of networking is an encouraging sign, whether it is somewhat strictly vendor dependent (i.e. Datapoint, IBM, etc.) or whether it is compatible with systems by other vendors (Xerox Ethernet, etc.). These communications links are the highways upon which integrated systems will develop. Network controllers often become intelligent sources of shared software programs and the controller for shared resource usage.
- Always compare the depth of the available software packages with WP or DP packages you are more familiar with. If a DP company, for instance, is offering a WP package of their own, investigate its adequacy when compared to packages offered by conventional word processors. One shouldn't have to sacrifice useful features simply because the DP company didn't do their office automation homework. On the other hand, if a word processing vendor is offering something like List Processing, make sure it compares favorably with similar packages by DP vendors and other WP vendors.
- The availability of voice processing equipment, if that is important to your operation.
- The modularity of a system and the ease with which it can be expanded.
- The availability of special and personal computing functions—i.e. electronic mail, scheduling, calendaring—may be important to your organization.
- The availability of training programs from the vendor for whatever levels of people would be involved.
- The reputation of the vendor in the marketplace and the likelihood that their integration plans will continue to expand over the coming years.
- The availability of system upgrades for your current equipment in order to create an integrated system from the components that you currently employ. Your current vendor supplier could let you know if this is possible or not.

A FINAL WORD

The concept of integration is key to the future of office systems. The emphasis should be, however, on the demystifying of systems and ease of use rather than the ornate stacking of component upon component, software package upon package, and the necessities of understanding how computers work. The office worker doesn't necessarily care how it works, as long as he/she can use it.

WP/DP Office Systems

The following tabulations cover the parameters, features and pricing of twelve office systems currently being marketed by eleven vendors.

The first, or even-numbered pages, cover System Configuration; System CPU features; Storage Media capacity; Peripherals; Workstation Features; and Communications availability for each system.

The second, or odd-numbered pages, cover Word Processing Features; Availability of Advanced Functions; and Pricing & Terms, including Training.

WP/DP Office Systems

COMPANY	Basic Four	Basic Four	Commodore	Datapoint
COMPUTER	Sys. 200, 210, 510, 610, 730	File Mgmt. Computer/S80	8032	3800
WP SOFTWARE	Dataword II	Dataword II	Wordcraft 80	IEOS
MIN. MEMORY REQUIREMENT FOR WP	96K	64K	32K	60K
ENVIRONMENT	Centralized	Centralized	Standalone	Centralized & Decentralized
CONCURRENT WP/DP	Standard	Standard	None	None
Max. No. of Workstations	4	4	N/A	256
Max. No. of Printers	4	4 plus 1 sys. printer	N/A	Configuration dependent
SYSTEM CPU				
Microprocessor Type	—	Z80A	6502	8-bit Datapoint
Memory Type	MOS	MOS	MOS	MOS
Main Memory Size	64K to 512K	64K	32K	96K to 256K
Operating System	BOSS	BOSS Level 5	Commodore BASIC	DOS (RMS avail. 12/81)
Programming Language	BASIC	BASIC	Commodore BASIC, 8032 machine lang.	RPG, COBOL, FORTRAN, RPG-PLUS
STORAGE MEDIA				
Removeable Media:				On File Processor
Type	—	Diskette	Diskette	Disk
Capacity	—	2.4Mb	500K	10-180Mb
Non-Removeable Media:			None	On File Processor
Type	Winchester Disk	Winchester Disk		Disk
Capacity	10-600Mb	2.17Mb		180Mb
PERIPHERALS	Tape cartridge, tape drive	—	Communicates with RS-232 devices	Phototypesetters, OCR via comm., RS-232 devices
WORKSTATION FEATURES				
Terminals	Intelligent (wp)	Intelligent	Intelligent	Intelligent
Screen	15" CRT	15" CRT	15" CRT	12" CRT
Capacity	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines
Character Generation	7 x 9 dot matrix	7 x 9 dot matrix	8 x 8	5 x 7
Color	Green on Black	Green on Black	Green on Black	Lgt. green/dk. grn.
Buffer Size	1920 chars.	1920 chars.	2,000	1920
Status Line Info. Displayed	Margins/tabs, doc. name, page no., line/col position, on 1st & succeeding pages	Margins/tabs, doc. name, page no., line col. position on 1st and succeeding pages	Chpt., drive, file no., doc. name, date, no. of pp, page no.	Margins, tabs, doc. name, no., line/col position, 1st page only
Vertical Scrolling	Page	Page	Line	Line, page
Horizontal Scrolling	To 256 chars.	To 256 chars.	To 117 chars., continuous	To 140 chars., continuous
Keyboard:	Cable-connected	Cable-connected	Integral	Cable-connected
No. Alphanumeric Keys	47	47	73	96 Char. ASCII
No. Function Keys	21	21	9	9
No. Programmable Keys	None	None	None	5
Numeric Keypad	Dual-function	Dual-function	Standard	Standard
Help Feature Access	Via menu	Via menu	None	Type HELP
Printers:				
Impact Type & Speed	45 cps daisywheel	45 cps daisywheel	40 cps daisywheel 60 cps Commo. 4022 160 cps Mannesman-Tal	30/45 cps daisy-wheel 240-900 lpm line
Non-Impact Type & Speed	—	—	—	—
Queueing to Printer	Standard	Standard	Standard	Standard
No. of Pages/Documents	15 documents	15 documents	10 pages	No limit
Queueing from Multiple Stations	Standard	Standard	—	Standard
COMMUNICATIONS				
Availability	Optional	Optional	Standard	NC option
No. of Ports	—	—	1	—
Protocols & Speeds	2780/3780 at 2400 to 9600 bps	2780/3780 at 2400 to 9600 bps	Async., ASCII 110-9600 bps	EMS, TTY, Telex, TWX 110-96K bps
Network Architecture Supported	None	None	—	Hybrid
Network System	—	—	—	ARC
Network Protocol	None	None	—	Proprietary

WP/DP Office Systems

Basic Four	Basic Four	Commodore	Datapoint	COMPANY
Sys. 200, 210, 510, 610, 730 Dataword II	File Mgmt. Computer/ S80 Dataword II	8032 Wordcraft 80	3800 IEOS	COMPUTER WP SOFTWARE
Standard Standard Standard Via insert mode Standard Standard Standard Standard No Standard	Standard Standard Standard Via insert mode Standard Standard Standard Standard No Standard	None None Standard Gram. segment keys Standard Under file name, chpt Standard Standard Standard Standard	Standard Standard Via insert mode Standard Title/History/Subject Standard Standard Standard Standard Standard	WORD PROCESSING FEATURES Menu Driven Menu Bypass Machine Dialog Insert/Delete Auto. Indexing: Document Title/Doc. History Default Format Format Stored w/Document Format Stored in separate Doc. Document Assembly/Merge
Standard Standard Hyph. manual w/algo- rithm; Justification on printout Standard None Standard 50 characters One	Standard Standard Hyph. manual w/algo- rithm; Justification on printout Standard None Standard 50 characters One	Standard Standard Manual Standard None Standard 30 1, foreground None	Standard Standard Hyph. manual; auto. justification Standard None Standard None	Auto. Page Number/Renumber Auto. Pagination/Repagination Hyphenation/Justification Temporary Margins/Tabs Footnote Tie-In Global Search/Replace: Size of String No. of Strings per Pass Column Operations: Column Move Totals/Subtotals Snaking/Non-Snaking Auto. File Sort/Select No. Sort Levels No. Select Levels Auto. Widow Adjust Term Dictionary/Glossary Spelling Dictionary
Standard Standard None Screen sort One On dp side only Standard Standard Std., 50,000 words	Standard Standard None Screen sort One On dp side only Standard Standard Std., 50,000 words	None None None Standard None	Standard No limit via AIM — None None None None	ADVANCED FUNCTIONS Graphics: Charts & Graphs Stored Line Segments Electronic Mail: Messaging/Document Distribution Store & Forward Function Priority Delivery Calendaring Scheduling Tickler File
None	None	None	None	PRICING Purchase Price
None	None	None	Standard	Rental
None None None	None None None	None	Standard Standard	Maintenance
None None None	None None None	None None None	None None None	Training
\$24,900 to \$150,000 dependent upon con- figuration —	\$16,500 and up de- pendent upon con- figuration —	\$5,700 ¹ Through dealer option	\$44,015 ¹ \$72,650 ² \$2,465 ¹ \$3,770 ²	COMMENTS
By Sorbus	By Sorbus	Through dealer	\$358 ¹ \$584 ²	
Two days training for two operators per terminal—class- room and manual	Two days training for two operators per terminal—class- room and manual	Operator instruction manual. Other train- ing through dealer. ¹ Includes 8050 dual drives, 8032 computer, letter quality printer.	One person from organi- zation at Datapoint office. Audio-Cassette and Simplified Users Guide avail. for fee ¹ 1892 Startpac consis- ting of 1 file proc- essor (128K), 1Mb disk- ette, 10Mb cartridge, 2 workstations, a pas- sive hub, 1 quality printer. ² 4735 ARC Pac consisting of 1 file processor (20Mb), 5 workstations, 1 active hub, 1 quality printer.	

WP/DP Office Systems

COMPANY	Four Phase	Honeywell	IBM	Nixdorf
COMPUTER	Any Four Phase mini	DPS 6 and Level 6	8100	8845
WP SOFTWARE	ForeWord	WP-6	DOSF/DISSOSS ¹	8845/4 WP
MIN. MEMORY REQUIREMENT FOR WP	96K	128K	756K	80K
ENVIRONMENT	Centralized or De-centralized Standard	Centralized & De-centralized Standard	Standalone or De-centralized Standard	Centralized & De-centralized Standard
CONCURRENT WP/DP				
Max. No. of Workstations	32	—	24 units—workstations and/or printers	12
Max. No. of Printers	16	—		12
SYSTEM CPU				
Microprocessor Type	Four Phase	—	—	—
Memory Type	Semiconductor	MOS w/EDAC	MOSFET	MOS
Main Memory Size	24K to 256K	256K to 16Mb	256K to 512K	128K
Operating System	MFE/4 or IDOS	GCOS 6	DPCX	NIOS
Programming Language	COBOL	COBOL	COBOL, FORTRAN	EDITOR
STORAGE MEDIA				
Removeable Media:				
Type	Diskette	Diskette	Diskette	Disk
Capacity	150K characters	650Kb	29Mb	66Mb & 33Mb
Non-Removeable Media:				
Type	Winchester Disk	Disk	Disk	
Capacity	138Mb	13Mb to 67Mb	322Mb	
PERIPHERALS	Phototypesetters, OCR, batch communicating devices, storage options	OCR	Mag Card II	Magnetic tape
WORKSTATION FEATURES				
Terminals	Non-Intelligent	Non-Intelligent	—	Intelligent
Screen	15" CRT	12" CRT	15"	12" CRT
Capacity	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines
Character Generation	7 x 9 dot matrix	7 x 9 dot matrix	7 x 9	7 x 9
Color	Amber or Grn on Blk.	Green on Black		White on Black
Buffer Size	1920 characters	1920 chars.	1920	1,920
Status Line Info. Displayed	Margins, tabs, line/col. position	Margins/tabs, doc. name, page no., % of disk full, all pages	Margins, tabs, line col. position, doc. pg. no.	Margins, tabs, doc. name, page no., line/col. position, % of disk full
Vertical Scrolling	Full	Full	—	18 lines in wp mode
Horizontal Scrolling	In 20 char. increments to 320 chars.	To 160 chars., 10 char. segments	To 151 chars.	To 158 chars., segmented
Keyboard:				
No. Alphanumeric Keys	Cable-connected	Cable-connected	—	Cable-connected
No. Function Keys	Std. Selectric	Std. typewriter	Std. Selectric	96
No. Programmable Keys	27	13	—	28
Numeric Keypad	—	14	None	10
Help Feature Access	None	None	None	Standard
	Via menu	Via menu	Via menu	Help key
Printers:				
Impact Type & Speed	45/55 cps daisywheel 120 lpm dot matrix 450 lpm line	35/55 cps Spinwriter	55 cps daisywheel	45 cps daisywheel 300-600 lpm line
Non-Impact Type & Speed	Ink jet and laser via comm.	—	24 pp/min. laser	
Queueing to Printer	—	Standard	Standard	Standard
No. of Pages/Documents	2056	No limits	—	—
Queueing from Multiple Stations	—	Standard	Standard	Standard
COMMUNICATIONS				
Availability	Optional	Optional	Standard	Optional
No. of Ports	Up to 20	2 to 112 current loop	—	1 async.-1 bisync.
Protocols & Speeds	2780/3780 at 1200 to 9600 bps	2780/3780, 3270, HASP, 110 to 72K bps	SDLC at 1.2K to 96K bps	2780/3780 to 9600 bps
Network Architecture Supported	Hierarchical	Hierarchical	Hierarchical	Star
Network System	SNA	DSA	SNA	Nixdorf communications
Network Protocol	SDLC	—	SDLC	2780/3780

WP/DP Office Systems

Four Phase	Honeywell	IBM	Nixdorf	COMPANY
Any Four Phase mini	DPS6 and Level 6	8100	8845	COMPUTER
ForeWord	WP-6	DOSF/DISOSS ¹	8845/4 WP	WP SOFTWARE
Standard	Standard	Standard	Standard	WORD PROCESSING FEATURES
Standard	Standard	Standard	None	Menu Driven
Standard	Standard	—	Standard	Menu Bypass
In insert mode	Via insert mode	Hot Keyboard	In insert mode	Machine Dialog
None	Standard	Standard	Standard	Insert/Delete
—	Oper., rev. date	Name, Oper. No., Date	—	Auto. Indexing:
Standard	Standard	Standard	Standard	Document Title/Doc. History
—	Standard	—	—	Default Format
Stored text assembled text & merged w/key.	Standard	Standard	Standard	Format Stored w/Document
Standard	Standard	Standard	Standard	Format Stored in separate Doc.
Standard	Standard	Standard	Standard	Document Assembly/Merge
Manual hyph., justification on printout	Background via algorithm; justification on printout	Auto. via Spelling feature; justification on screen/print	Hyph. manual; justification on printout	Auto. Page Number/Renumber
Standard	Standard	Standard	Standard	Auto. Pagination/Repagination
Standard	Standard	Standard	Standard	Hyphenation/Justification
Standard	Standard	Standard	Standard	Temporary Margins/Tabs
Standard	Standard	Standard	Standard	Footnote Tie-In
Standard	Standard	Standard	Standard	Global Search/Replace:
78 characters	60 characters	60 characters	16 characters	Size of String
One	One, foreground	One	1	No. of Strings per Pass
Standard	Standard	Standard	None	Column Operations:
Standard	Standard	Standard	—	Column Move
None	None	—	—	Totals/Subtotals
Standard	Standard	Standard	Optional	Snaking/Non-Snaking
—	One	—	—	Auto. File Sort/Select
—	One	—	—	No. Sort Levels
None	Standard	Standard	Standard	No. Select Levels
Standard	None	Standard	Standard	Auto. Widow Adjust
None	None	70,000 words	None	Term Dictionary/Glossary
				Spelling Dictionary
None	None	None	None	ADVANCED FUNCTIONS
—	—	—	—	Graphics:
—	—	—	—	Charts & Graphs
Optional	Standard	Under DISOSS	None	Stored Line Segments
Standard	Standard	Standard	—	Electronic Mail:
None	Standard	Standard	—	Messaging/Document
Standard	Standard	Standard	—	Distribution
Under OMS IV	Standard	Standard	—	Store & Forward Function
Under OMS IV	Standard	Standard	—	Priority Delivery
Under OMS IV	Standard	Standard	—	Calendaring
				Scheduling
				Tickler File
\$100,000 ¹	—	2	\$99,480 ¹	PRICING
\$2,300 (lease)	—	2	\$3,651 (36/mo.)	Purchase Price
\$500	—	2	\$787 (monthly)	Rental
No restrictions on an as available basis. Manual includes self-paced component at operator level.	—	ASSIST pkg. for user install. of standalone 8100. First Use book for self-study. Audio-Visual training.		Maintenance
¹ Configuration consists of Sys. IV-50 72K CPU, 8 wksts., 3 3.5Mb disks, 3 daisy-wheel printers.		¹ DOSF del'd 7/81 DISOSS scheduled 11/82.	¹ Configuration consists of: 1 CPU w/ 128K memory; 1 33Mb disk, 8 workstations, 3 43 cps printers, 1 165 cps serial printer, 1 9-track 1600 bpi mag tape, and 1 diskette drive.	Training
		² Varies by amount of storage & number of terminals.		COMMENTS

WP/DP Office Systems

COMPANY	Northern Telecom	Prime	Radio Shack	Wang
COMPUTER	405 and 445	Series 50	TRS 80 II	2200
WP SOFTWARE	OmniWord	Office Automation System (3 Modules)	SCRIPSIT	Word Processing
MIN. MEMORY REQUIREMENT FOR WP	64K (405) 128K (445)	1Mb for 10 users, 2/4Mb ea. additional 7 users	64K	—
ENVIRONMENT	Decentralized	Centralized	Standalone	Decentralized
CONCURRENT WP/DP	Three wkstns. can concurrently use wp	Standard	None	Separate Access
Max. No. of Workstations	1 (405) 8 (445)	63	—	2200LVP; 12-2200MVP
Max. No. of Printers	Up to 8	—	—	—
SYSTEM CPU				
Microprocessor Type	Intel 8080/8085	—	Z80	MOS
Memory Type	MOS	MOS	—	32-256K
Main Memory Size	48K to 256K	256K to 8Mb	64K	—
Operating System	OmniTask	Primos	TRSDOS	BASIC
Programming Language	COBOL, TAL-2000, BASIC (405)	BASIC, FORTRAN, COBOL	FORTRAN, COBOL, BASIC, Assembly	—
STORAGE MEDIA				
Removeable Media:				
Type	Diskette (405)	—	Diskette	Diskette
Capacity	256K	—	350K	786K to 1Mb
Non-Removeable Media:				
Type	Disk (445)	Disk: 16Mb for WP, 14Mb for Mgmt. Comm. & 18Mb for Adv. Text Mgmt.	—	Disk
Capacity	14-74.5Mb	—	—	8 to 20Mb
PERIPHERALS	Mag tape, comm., Bridge (channel connect to Model 76RJE)	—	—	OCR
WORKSTATION FEATURES				
Terminals	Non-Intelligent	Intel. & Non-Intel.	Intelligent	Non-Intelligent
Screen	15"	14"	12" CRT	12"
Capacity	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines	80 chars. x 24 lines
Character Generation	7 x 9	9 x 12	5 x 7 dot matrix	—
Color	Green on Dark	White on Black	White on Black	Green on Gray
Buffer Size	2,000K	1920	8K	1920
Status Line Info. Displayed	Margins, tabs, doc. name, line/col. position, all pages	—	Margins, tabs, doc. name/pg. no., % of disk full, line/col. position	Margins, tabs, line/col. position, doc. pg. no., on all pages
Vertical Scrolling	Continuous	Page	Virtual	Page
Horizontal Scrolling	To 160 chars., continuous	—	Virtual	To 158 chars.
Keyboard:				
No. Alphanumeric Keys	Cable-connected	Cable-connected	Cable-connected	Integral
No. Function Keys	78	96 Char. ASCII	76	96 Char. ASCII
No. Programmable Keys	12	24	—	26
Numeric Keypad	In dp mode	None	2	16
Help Feature Access	Standard	Standard	Standard	Standard
Printers:				
Impact Type & Speed	40 cps daisywheel, 180 cps dot matrix, 300-600 lpm line	55 cps daisywheel	43 cps daisywheel	35 cps daisywheel
Non-Impact Type & Speed	—	—	—	70-222 cps dot matrix
Queueing to Printer	None	No limit	Standard	No limit
No. of Pages/Documents	—	Standard	Disk contents	Standard
Queueing from Multiple Stations	—	—	—	—
COMMUNICATIONS				
Availability	Standard	Standard	Standard	Optional
No. of Ports	2	—	—	—
Protocols & Speeds	2770, 3780, SDLC, CDC, 3774 SDLC, 3271/7 96Kb to 2400Kb	—	Async. ASCII up to 19,600 bps	3274 & 3274 SDLC (1/82); Teletext & XDDT (12/81); 3271 currently
Network Architecture Supported	Ring	Ring	None	—
Network System	OmniLink	PrimeNet	None	Wangnet (1982)
Network Protocol	Proprietary	X.25	None	HDLC

WP/DP Office Systems

Northern Telecom	Prime	Radio Shack	Wang	COMPANY
405, 445	Series 50	TRS 80 II	2200	COMPUTER
OmniWord	Office Automation System (3 Modules)	SCRIPSIT	Word Processing	WP SOFTWARE
Standard	Standard	Standard	Standard	WORD PROCESSING FEATURES
None	—	—	—	Menu Driven
Standard	Hot keyboard	None	Via insert mode	Menu Bypass
Via insert mode	Standard	Standard	Standard	Machine Dialog
None	4-user defined codes	Standard	Standard	Insert/Delete
Standard	Standard	Standard	Standard	Auto. Indexing:
—	—	Standard	Standard	Document Title/Doc. History
Standard	—	Standard	Standard	Default Format
Standard (during edit & printout)	Standard	Standard	Standard	Format Stored w/Document
Standard	—	Standard	Standard	Format Stored in separate Doc.
Standard	Opt. w/Adv. Text Management	Standard	Standard	Document Assembly/Merge
Hyph. manual; Justification auto. on screen & printout	Standard	Standard	Manual; auto. opt.	Auto. Page Number/Renumber
Standard	Standard	Standard	Standard	Auto. Pagination/Repagination
None	Standard	Standard	Standard	Hyphenation/Justification
Standard	Standard	Standard	Standard	Temporary Margins/Tabs
74	Standard	Standard	Standard	Footnote Tie-In
1, foreground	—	Optional	Standard	Global Search/Replace:
Standard	—	48 characters	Standard	Size of String
—	—	One, foreground	128 characters	No. of Strings per Pass
—	—	Optional	Standard	Column Operations:
In dp mode	—	—	Standard	Column Move
3 in wp	—	None	Standard	Totals/Subtotals
Semi-auto.	—	Standard	Standard	Snaking/Non-Snaking
Standard	—	Standard	Standard	Auto. File Sort/Select
None	Optional, 60,000 wds.	Standard	Standard	No. Sort Levels
—	—	Optional	—	No. Select Levels
—	—	—	—	Auto. Widow Adjust
—	—	—	—	Term Dictionary/Glossary
—	—	—	—	Spelling Dictionary
None	Optional 3rd Pty. Pkg. mktd. by Prime	None	Opt. workstation	ADVANCED FUNCTIONS
—	—	None	—	Graphics:
—	—	None	—	Charts & Graphs
None	Optional under Mgmt. Communications & Support module	None	—	Stored Line Segments
—	Standard	None	—	Electronic Mail:
—	—	None	—	Messaging/Document
—	Optional under Mgmt. Communications & Support Module	None	—	Distribution
—	—	None	—	Store & Forward Function
—	—	None	—	Priority Delivery
—	—	None	—	Calendaring
—	—	None	—	Scheduling
—	—	None	—	Tickler File
\$12,000-\$13,000 (405) ¹	\$200,000 to \$400,000	\$6,197 ¹	\$24,000 average price	PRICING
—	Prime 5-Yr. lease available	Leasing avail.	Configuration dependent	Purchase Price
—	—	Available	Configuration dependent	Rental
One person from organization for three days (or one operator & one supvr.) Training fee.	Five levels of training avail. through Customer Education Group for a fee. Consists of classroom instruction.	Eight lesson audio course in visuals manual supplied at no fee.	Contractual agreement on individual basis	Maintenance
¹ Acts as a stand-alone in wp mode	—	¹ Includes TRS 80, printer & software.	—	Training
—	—	—	—	COMMENTS

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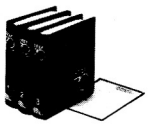
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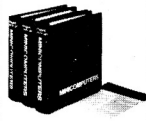
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